

SECTION 25170

TESTING, IDENTIFICATION AND ADMINISTRATION

PART 1 - GENERAL

1.1 SUMMARY

SCOPE

1. This section includes the minimum requirements for the testing, certification administration and identification of backbone and horizontal cabling.
2. This section includes minimum requirements for the following:
 - a) UTP testing and testers
 - b) Fiber optic testing and testers
 - c) Labels and Labeling
 - d) Documentation
3. Related Sections include the following:
 - a) 17150 Backbone Cabling Requirements
 - b) 17160 Horizontal Cabling Requirements.

1.2 QUALITY ASSURANCE

- A. All testing procedures and testers shall comply with applicable requirements of:
 1. ANSI/TIA/EIA 568- B.1 Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements
 2. ANSI/TIA/EIA 526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
 3. ANSI/TIA/EIA 526-14A Measurement of Optical Power Loss of Installed Multimode Fiber Cable Plant.
- B. Identification and administration work specified herein shall comply with the applicable requirements of:
 1. ANSI/TIA/EIA – 606-A Administration Standards.
 2. ANSI/TIA/EIA – 569-A Pathway and Spaces
 3. ANSI/TIA/EIA – 568-B Telecommunications Cabling Standard.
 4. ANSI/TIA/EIA – 758-A Customer Owned Outside Plant Telecommunications Cabling Standard
 5. BICSI Telecommunications Cabling Installation Manual
 6. BICSI Telecommunications Distribution Methods Manual

1.3 SUBMITTALS

- A. Manufacturers catalog sheets and specifications for fiber and copper cable testers.
- B. Test reports

PART 2 - PRODUCTS

2.1 OPTICAL FIBER CABLE TESTERS

A. Multimode optical fiber light source

1. Shall be capable of testing to TIA 568-B.1 and ANSI/TIA/EIA 526-14A criteria.
2. Shall meet the launch requirements of ANSI/EIA/TIA-455-50B.
3. Provide 850nm and 1300nm +/- 20 nm wavelength LED light sources
4. Spectral width of sources shall be $\leq 50\text{nm}$ for 850nm wavelengths and $\leq 140\text{nm}$ for 1300nm wavelengths.
5. The output of the light source shall be 8 MW for 62.5um core optical fiber
6. Output Stability +/- 0.40 dB from 0 to 50 degrees C
7. Long Term output stability +/- 0.10dB at 25 degrees C
8. Power shall be from rechargeable Ni-Cad batteries
9. Connector types shall include: MTRJ, ST and SC
10. Acceptable Manufacturers: Fluke ; mfg# DPS2000 + Fiber Test Kit (or better)

B. Single mode optical fiber light source

1. Shall be capable of testing to TIA 568-B.1 criteria.
2. Shall meet the requirements of ANSI/TIA/EIA 526-7.
3. Provide 1300nm and 1500nm +/- 20 nm wavelength Laser light sources
4. Output Stability +/- 0.40 dB from 0 to 50 degrees C
5. Long Term output stability +/- 0.10dB at 25 degrees C
6. Power shall be from rechargeable Ni-Cad batteries
7. Connector types shall include: MTRJ, ST and SC
8. Design make:
9. Acceptable Manufacturers:
 - Fluke – DPS2000 (or better)

C. Power Meter

1. Shall be capable of testing to TIA 568-B.1 criteria.
2. Provide 850nm, 1300nm and 1500nm +/- 20 nm wavelength test capability
3. Measurement range shall be from 10 to -60 dBm
4. Accuracy shall be +/- 5% at 0 to -50dBm and +/- 10% 10 to 0dBm and -50 to -60 dBm.
5. Resolution shall be 0.1 dB
6. Connector types shall include: ST and SC
7. Design make:

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8. Acceptable Manufacturers:
 - a) Fluke - Model 43 B (or better)

D. Optical Time Domain Reflectometer (OTDR)

1. Shall be capable of testing to TIA 568-B.1 criteria.
2. Shall have a front CRT display
3. Connector types shall include: ST and SC
4. Design Make: Fluke or better

2.2 100 OHM UTP TESTER

- A. Shall be capable of testing to TIA 568-B.1 criteria.
- B. Physical interface shall be modular RJ-45 connector and a serial port with DB-9 connector.
- C. Shall have auto-testing to determine if cable meets the requirements of TIA/EIA 568-B.1, ISO Class C, D, 10 Base-T, Token Ring, Fast Ethernet and ATM standards.
- D. Acceptable Manufacturers:
 - Fluke or better

2.3 LABELS

- A. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.
- B. Shall be preprinted or laser printed type.
- C. Where used for cable marking provide vinyl substrate with a white printing area and a clear "tail" that self laminates the printed area when wrapped around the cable. If cable jacket is white, provide cable label with printing area that is any other color than white, preferably orange or yellow – so that the labels are easily distinguishable.
- D. Where insert type labels are used provide clear plastic cover over label.
- E. Provide plastic warning tape 6 inches wide continuously printed and bright colored 18" above all direct buried services, underground conduits and duct-banks.
- F. Acceptable Manufacturers:
 - Brothers (or better)

PART 3 - EXECUTION

3.1 OPTICAL FIBER CABLE TESTING

- A. Test all fibers with launch and far end cable of sufficient length for the OTDR to be able to see through all installed connectors.
- B. Localized attenuation shall not exceed 0.50 dB at any point.
- C. Backbone multimode fiber shall be tested at both 850nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A method B.
- D. Backbone single mode fiber shall be tested in at both 1310nm and 1550 nm in accordance with ANSI/EIA/TIA-526-14A method A.1.
- E. Multimode fiber shall conform to the following:

850 nm:

<u>Length (meters)</u>	<u>Attenuation (dB)</u>
500	3.25
1000	5.0
1500	6.5
2000	8.5

1300 nm:

<u>Length (meters)</u>	<u>Attenuation (dB)</u>
500	2.2
1000	3.0
1500	3.8
2000	4.5

F. Single Mode Fiber shall conform to the following (note: taken at 1550nm)

Inside:

<u>Length (meters)</u>	<u>Attenuation (dB)</u>
500	2.0
1000	2.5
1500	3.0
2000	3.5
2500	4.0
3000	4.5

Outside:

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<u>Length (meters)</u>	<u>Attenuation (dB)</u>
500	1.8
1000	2.0
1500	2.2
2000	2.5
2500	2.8
3000	3.0

3.2 100 OHM UTP CABLE TESTING

- A. The testing parameters called for in this section shall include the horizontal Link/**channel** for all installed drop locations.
- B. Test cable with test set to match the NVP for the cable as stated by the cable manufacturer of the cable being installed.
- C. The test parameters shall include Wire Map, Length, Attenuation, PS-NEXT, PS-ACR, PS-ELFEXT and Return-Loss
- D. Wire Map
 - The wire map test shall verify pair to pin termination at each end and check for connectivity errors. The wire map shall indicate the following for each of the eight conductors:
 - a) Continuity to the remote end
 - b) Shorts between any two or more conductors
 - c) Crossed pairs
 - d) Reversed Pairs
 - e) Split Pairs
 - f) Any other miss wiring
- E. Cable Performance
 - Must meet the minimum acceptable values as indicated in TIA/EIA 568B.1 **Category 6 (TIA/EIA 568B.2-1)** requirements.

3.3 IDENTIFICATION & LABELING

- A. Confirm specific labeling requirements with customer's project coordinator prior cable installation or termination.

B. Cables

1. Backbone cables shall be marked at each endpoint and at all intermediate pull/access points or junction boxes. Label shall indicate origination and destination TR ID, sheath ID and strand or pair range.
2. Horizontal cables shall be marked at each end, on the sheath indicating the TR, patch panel and panel port to which the cable is wired. Faceplates and Patch Panels

C. Faceplates and Patch Panels

1. Optical Fiber Patch Panels
 - a) Fiber patch panels shall be marked using adhesive labels indicating the range of circuits installed to it.
 - b) Each port shall be labeled with the origination and destination with the individual strand ID.
2. Faceplates
 - Shall be labeled to indicate the room number and panel port [A thru Z] to which the cable is wired for each cable that it houses.

3.4 RECORD COPY AND AS - BUILT DRAWINGS

- Provide record copy drawings periodically through out the project as per 25030 or as requested by the project manager and at end of the project. Record copy drawings shall include notations reflecting the as built conditions of any additions to or variation from the drawings provided.

3.5 TEST RESULTS

1. Horizontal Copper Cabling
 - a) The Contractor shall test all cables and submit all horizontal copper cable test result data in electronic format, with the resulting file formatted with one test result per 8.5"x 11" page.
 - b) To provide the test results in an acceptable format:
 - 1) Export or Download the test results from the cable tester to a *.txt format.
 - 2) Then open the *.txt file in Microsoft WORD 6.0 and save the file as a *.doc file.
2. Fiber Optic Cables
 - a) The Contractor shall test all fiber optic cables and submit all fiber test result data in an electronic format and provide one (1) hard copy of the test results showing graphically, the entire length of the fiber.
 - Reports shall show circuit ID, cursor marks, total attenuation, date of installation and test used.
 - b) Contractor shall submit (1) copy of software capable of viewing the electronic test result files.

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3. High Pair Count Copper Cables
 - a) The Contractor shall test all high count copper cables and submit test result information in an electronic format. Minimal acceptable formats are Word 6.0 or Excel 95/97.
 - b) See project coordinator for required format for test report documentation.

END OF SECTION